THE SOUTH AFRICAN SPECIES OF AIZOACEAE

VII. *AIZOON*

by

R. S. Adamson.

AIZOON

The genus *Aizoon* L. contains about 25 species and has a wide but discontinuous range. It occurs in three separated areas. Of these the first which contains the largest number of species and is the one dealt with here, is in southern Africa extending from southern Angola through the western districts and along the south and east coasts. It reaches its northern limit in Portuguese East Africa. There is a record of one species in Tanganyika but there is doubt whether it is really indigenous there. The second area is in Africa north of the Sahara extending through the Middle East to Persia and N.W. India. This area also extends to the Atlantic Islands, Madeira and the Canaries, and one species occurs in Europe in southern Spain and Sicily. This northern area has its southern limits at Cape Verde on the west and Socotra on the east. The third area is Australia. No species occur in common between Australia and either of the other areas. One species, *A. canariense* L., occurs in both the northern and southern areas in Africa. All the others are restricted to one or the other.

In founding the genus Linnaeus described three species. In this account fifteen species are recognised for the southern Africa area of distribution.

AIZOON

L. Sp. Pl. 488. 1753; Gen. Pl. ed. 5. 216. 1754.

Veslingia Moench Meth. Pl. Supp. 299. 1802.

Gunniopsis Pax Engl. & Prantl Nat. Pflzf. 1. ed. 3. 1.b: 44. 1889.

Aizoanthemum Dinter ex Friedr. Mitt. Bot. Munch. 17—18: 3422. 1957.

Perennial or annual herbs, less often shrublets, often partly succulent. Leaves exstipulate, opposite or alternate. Flowers in cymose groups, often in forks of the stem, sessile or shortly stalked. Perianth segments 4 or 5, united at the base. Stamens numerous, attached to the lower part of the perianth, sometimes in groups, sometimes in 2 or more rows. Ovary superior, 4, 5, 7 or 10 chambered, often flattened and wider than deep: ovules 2—many in each chamber: stigmas as many as the chambers, rather thick. Fruit dry, splitting at the top by as many slits as there are chambers. Seeds pear-shaped or reniform, usually slightly compressed.

The type species is *A. canariense* L.

Low growing drought-resistant plants characteristic of open ground especially in the drier areas. Flowers yellow, less often white or pink.

The species fall into three subgenera which have been looked upon as separate genera. The Australian species belong to the subgenus *Gunniopsis* Pax & Hoffm. Engl. & Prantl Nat. Pflzf. ed. 2. 16c: 223. 1934 which is readily characterised by 4-merous flowers and fruits splitting into 8 valves. The African species are in two subgenera, *Aizoon* and *Aizoanthemum*, both of which occur in both the areas of distribution.

KEY TO THE SUBGENERA.

1. Flowers 5-merous: carpels 5, 7 or 10: fruit with as many valves as carpels.
  2. Hairy: carpels 5: filaments filiform: fruit valves not spreading, not hygroscopic .. .. 1. *Aizoon*
  2. Papulose: carpels 5, 7 or 10: filaments flattened: fruit valves spreading, hygroscopic .. .. 2. *Aizoanthemum*

(*1.* Flowers 4-merous: carpels 4: fruit with twice as many valves as carpels. Australia. .. .. 3. *Gunniopsis*)

Subgen. 1. *Aizoon.*

Perennials or less often annual, covered with hairs. Flowers either solitary among the leaves or in the forks of a cymose inflorescence, 5-merous. Stamens with filiform filaments. Fruit splitting to form 5 valves which remain incurved and often attached at the tip. The valves not hygroscopic.

KEY TO THE SPECIES.

1. Flowers among the leaves apparently lateral.
  2. Stems prostrate, usually elongated.
    3. Stem and leaves with spreading hairs.
      4. Hairs scattered, rather stiff: flowers crowded: perianth incurved: fruit red .. .. .. 1. *canariense*
      4. Hairs dense, fine: flowers usually solitary.
        5. Hairs all spreading, especially on the perianth: perianth spreading: fruit pale 2. *glinoides*
        5. Some hairs spreading, some appressed: perianth with appressed hairs .. .. 3. *rigidum* var. *villosum*
    3. Stem and leaves with appressed silvery hairs.
      6. Leaves alternate, narrowed to the base or petiolate: perianth segments acute or acuminate .. .. 3. *rigidum*
      6. Leaves opposite, sessile: perianth segments more or less obtuse .. .. 4. *Zeyheri*
  2. Stems erect or with erect branches.
    7. Stems short, woody with short branches at or close to ground level.
      8. Young stems and leaves densely covered with coarse appressed hairs: flowers crowded .. 5. *Burchellii*

8. Young stems and leaves thinly covered with short coarse appressed hairs: flowers not crowded.
9. Leaves involute, subulate, often pungent: perianth segments united for half their length .. .. 6. *asbestinum*
9. Leaves flat or partly folded: perianth segments united at the base only .. .. 7. *karooicum*
7. Stem and branches elongated, erect, virgate.
10. Stems all woody: young parts covered with coarse appressed hairs: leaves less than 2 cm. long: flowers mostly solitary .. .. .. 8. *Schellenbergii*
10. Flowering stems herbaceous: young parts covered with fine appressed hairs, the older glabrescent: leaves over 3 cm. long: flowers in groups .. .. 9. *virgatum*
1. Flowers terminal or in the forks of the stem: plants mostly prostrate.
11. Leaves flat: flowers many in a terminal inflorescence 10. *paniculatum*
11. Leaves terete: flowers solitary or in groups of three .. 11. *sarmentosum*

1. **A. canariense** L. Sp. Pl. 488. 1753.

A. procumbens Crantz Inst. 1: 135. 1766.

Glinus procumbens Forsk. Descr. 25. t.14. 1775.

Veslingia cauliflora Moench. Meth. Pl. Supp. 299. 1802.

Prostrate, rather thinly covered with stiff spreading hairs especially on the young parts and flowers. Stems stout, pale-coloured, branching, from very short to 30 cm. long, usually with some scales in addition to the hairs. Leaves alternate, finely papulose, oblong obovate or spatulate, occasionally subrotund, at the base narrowed to a petiole as long as or longer than the blade, at the tip obtuse or subobtuse. Leaves 1—5 cm. long, 0·4—1·5 cm. wide. Flowers sessile on the main stem and branches, often numerous and contiguous, dull yellow-green. Perianth segments with stiff spreading hairs outside, rather thin, triangular-acute, about 3 mm. long, usually incurved. Stigmas short. Fruit usually red, 5-angled, 0·3—0·6 cm. diam., depressed on top, the valves incurved and attached at the tip. Seeds compressed, dark brown, marked by acute concentric ridges.

The type is in herb. *Linn.* (650: 1).

Open ground in the drier parts of the coastal belt and on the western karoo. Frequent on disturbed ground and probably not truly indigenous in some of its stations.

While generally growing as an annual it can perennate and sometimes forms large patches. The leaves are flat on the ground. In fruit the outer edges of the valves curl upwards to allow escape of the seeds.

A very variable species in size, the amount of branching, the size of the leaves, and the quantity of hairs, especially in relation to habitat. Plants from the karoo often have very small narrow leaves, while those from moister stations may have much larger leaves and very few hairs.

Var. *denudata* Sond. Fl. Cap. 2: 469. 1862, which was based on *Ecklon & Zeyher* 2128, is not more than an extreme form from a sheltered habitat. Both in leaf-size and hairiness there are all stages of transition. Plants from Natal are large, with large leaves up to 5 cm. long and 2 cm. wide. There are all stages of intermediates.

The species is distinguished from all others by the petiolate papulose leaves with scattered spreading hairs, the crowded flowers, and the broad thin more or less incurved perianth lobes.

S.W.A. Aus *Dinter* 949 Z: Kl. Karas *Dinter* 4742 BOL.G.PRE.Z.

Cape.

NAMAQUALAND. Zadies *Schlechter* 75 BOL.K, s.n. BM.K.S: Spektakel *Compton* 11417 KIR: *Maguire* 387 KIR: *Johnson* 307 BOL: Brakfontein *Ecklon & Zeyher* 2128 BOL.S: Ratelkraal *Maguire* 323 KIR: Blaustasie *Compton* 17223 KIR: Wallekraal *Pillans* BOL: Klipfontein *Bolus* 9531 BOL: *Zeyher* BOL: Garies *Adamson* 5010: *Esterhuysen* 1413 BOL: Bitterfontein *Compton* 11053 KIR.

VAN RHYNSDORP. Nieuwerust *Adamson* 4988: Van Rhynsdorp *Adamson* 4535.

CLANWILLIAM. Clanwilliam *Schlechter* 8593 BM.BOL.G.K.S: Pakhuis *Adamson* 4518: Grays Pass *Adamson* 4474.

GORDONIA. Keimoes *Barnard* SAM: Putzies *Adamson* 2061.

KENHARDT. Jagbult *Acocks* 12660 PRE.

SUTHERLAND. Roggeveld *Rehmann* 3197 Z.

ABERDEEN. Fair View *Meyer* 3 PRE.

MIDDELBURG. Middelburg *Marloth* 4104 PRE.

SOMERSET EAST. Bruintjeshoogte *Burchell* 3103 K.

UITENHAGE. Sundays Riv. *Burchell* 2865 K.

ALBANY. Port Alfred *Esterhuysen* 15145 BOL: *Tyson* 2 SAM.

PORT ST. JOHNS. Port St. Johns *Moss* 4373 BM.

Natal.

PONDOLAND. Umzimklova *Jacottet* 24 Z.

PT. SHEPSTONE. Uvongo *Mogg* 13215 K.PRE.

UMZINTO. Dumisa *Rudatis* 1933 G.Z: Samvoti *King* 130 PRE.

PINETOWN. Pinetown *Wood* 533 BM.BOL. s.n. SAM.

DURBAN. Durban *Laverey* BOL: *Pillans* SAM: *Sanderson* S.TCD: *Schlechter* 2819 BM.BOL.G.K: s.n. SAM: Bluff *Leuring* BOL.

INANDA. Inanda *Wood* 681 K.

PIETERMARITZBURG. P.M.B. *Rehmann* 7522 Z: Umgeni *Rehmann* 8753, 8754 Z.

HLATISA. Hlukluwe *Wood* 2140 PRE.

WEENEN. Blaauwkrantz *Acocks* 9914 PRE.

UMVOTI. Mudin *West* 1235 PRE.

KLIP RIV. Van Reenen *Wood* G: Palmiet *Wood* G.

MGANDULI. Zinggob *Pegler* 2041 BOL.PRE.

? ? . "Chakas Kraal" *Gerstner* 2420 PRE.

TRANSVAAL. Houtbosch *Rehmann* 5907 Z: Zoutpansberg *Pole Evans* 3970 PRE.

Without locality:—*Ecklon & Zeyher* 2.9 Z: *Zeyher* 718 BM.G. Also in Portuguese East Africa and Tanganyika, "Karoo Region" *Holland* BOL. In the Atlantic Is., N. Africa, the Middle East, southern Arabia to Baluchistan. In Africa as far south as Eritrea.

2. **A. glinoides** L.f. Supp. Pl. 261. 1781.

A. hirsutum E. & Z. Enum. 325. 1837.

A green or grey-green softly hairy prostrate herb with branches in one plane. Covered all over or on the young parts with fine rather long spreading hairs. Stems 15—60 cm. long, the branches alternate. Leaves alternate, rather variable in size and shape, obovate, spatulate or subrotund, 1·5—5 cm. long, 0·5—1·5 cm. wide, finely papulose, densely hairy when young but partly glabrescent, at the tip obtuse cuspidate or acute, at the base narrowed to a petiole usually shorter than the blade. Flowers solitary, bright yellow. Perianth segments 0·3—0·8 cm. long, the outer acute or acuminate, the inner wider, mucronate, wide-spreading at anthesis, densely clothed with spreading hairs outside at least on the midrib. Fruit depressed-pentagonal, smooth, pale-coloured, 0·3—0·9 cm. diam. Seeds black, marked by rather fine concentric ridges often broken or replaced by dots in the central part.

The type is in herb. *Thunberg* U.

Rather dry open places in the eastern Cape.

Variable in size and in the quantity of hairs. Hairs white, grey or occasionally yellow. There are two forms separable on the size of the flowers and fruit though they are connected by intermediates. The commoner form has perianth segments 5—8 mm. long and fruits 6—8 mm. diam. The other has more numerous smaller flowers with perianth segments 3—5 mm. long, and fruits 3—6 mm. diam.

The species is distinguished by the prostrate habit, the long spreading hairs, the bright yellow flowers with wide-spreading perianth segments, and the smooth pale-coloured fruits.

WILLOWMORE. Willowmore *Lloyd* PRE.

ABERDEEN. Aberdeen Rd. *Pole Evans* 2542 K.PRE.

MURRAYSBURG. Murraysburg *Tyson* 301 SAM.

GRAAF-REINET. Graaf-Reinet *Adamson* 5204: *Bolus* 277, 435 BOL: *Henrici* 5018 PRE: *MacOwan* 277 TCD.

CRADOCK. E. of Cradock *Adamson* 5285: *Bolus* BOL: *Brynard* 261

PRE: *Dyer* 2129 PRE: *Marloth* 6852 PRE: Reyners Kop *Acocks* 11925 PRE: Lake Arthur *N. Rogers* K: Mortimer *Kensit* BOL.

SOMERSET EAST. Somerset East *MacOwan* Z.

SWELLENDAM. Slang Riv. *Adamson* 3818, 4612.

HUMANSDORP. Jeffreys Bay *Hutchinson* 1448 BOL.K: Gamtoos Riv. *Drege* S: *Martin* 652 KIR: Hankey *Fourcade* 2272, 3646 BOL.K.

UITENHAGE. Uitenhage *Ecklon* 189 TCD. s.n. S: *Ecklon & Zeyher* 259 BM.K.OXF.TCD: *Prior* K: *Schlechter* 2561 G.Z: Swartkops *Ecklon & Zeyher* 2131 G.K.OXF.S. s.n. S: *Ecklon* 259 BOL.S: *Drege* Z: Coega *Zeyher* Z: Enon *Thode* A2662 K.

PORT ELIZABETH. P.E. *Forbes* K: *Paterson* 1061 Z: *Paterson* 644 PRE.

ALEXANDRIA. Debega valley *Galpin* 10823 K: Frasers Camp *Compton* 19109 KIR: Nomago *Acocks* 12787 PRE: *Story* 1301 BOL.PRE: Alexandria *Esterhuysen* 15145 BOL: rd. to Grahamstown *Bolus* 1910 BOL.

ALBANY. Grahamstown *Adamson* 5270: *Bolton* S.TCD: *Dyer* 1662 K.PRE. 1663 K: *Ecklon* S: *Galpin* 13243 K: *Marloth* 10873 PRE: *Penther* 1806 S: *Rennie* 78 CT: *Rogers* 16649 Z, 27341 BOL.SAM, 35632 Z. Hounslow *Galpin* BOL: Bothas Hill *Dyer* 1437 PRE: West Hill *Adamson* 4764: Cradock Rd. *Dyer* 2129 K: Manley Flats *Compton* 19087 KIR: Alicedale *Rogers* 12030 K: Port Alfred *MacOwan* 445 TCD: Fish Riv. *Ecklon & Zeyher* 2130 BOL.K.OXF.S.TCD: s.l. *Bolus* 13281 BM: *Bowie* BM: *Gill* 43 PRE.

KEISKAMA. Boma Pass *Acocks* 9103 PRE.

BEDFORD. Bedford *Theron* 420 PRE. 1812 K.PRE.

FORT BEAUFORT. Katberg *Ecklon & Zeyher* 11.12 S.

VICTORIA EAST. Alice *Barker* 2101 KIR: Breakfast Vlei *Barker* 2840 KIR.

STOCKENSTROOM. Seymore *Scully* 47 SAM.

KING WILLIAM'S TOWN. K.W.T. *Comins* 1584 PRE: *Schlechter* 6125 K.Z: *Tyson* 976 BOL.SAM: rd. to Grahamstown *Adamson* 5270.

EAST LONDON. East London *O. Kuntze* K.

KOMGHA. Komgha *Flanagan* 120 PRE.SAM.

"British Kaffraria" *Cooper* 174 BM.BOL.K.TCD.Z.

NATAL. Isipingo *Ward* 380 PRE: Mkuzi *Johnson* 72 KIR.

Without locality:—*Drege A. glinoides* (*a*) G.K., *do.* (*b*) BM.K.OXF: *Niven* 17 BM: *Masson* BM: *Sparmann* S: *Thunberg* S: "Hort. Kew" BM:

3. **A. rigidum** L.f. Supp. Pl. 261. 1781.

White or grey, woody, prostrate, with or without short ascending branches, covered with short appressed hairs with some longer spreading ones on the younger parts. Stems on or in the ground, 8—15 cm. long, the branches 2—5 cm. long. Leaves alternate, often crowded, secund, obovate or spatulate, acute or apiculate, narrowed at the base to a short petiole. Leaves 0·5—1·5 cm. long, 0·3—0·8 cm. wide, flat or concave above, densely covered with short closely appressed hairs. Flowers solitary, on the upper parts of the stems. Perianth segments 5—6 mm. long, acute, externally covered with appressed hairs like those on the leaves. Fruit rounded-pentagonal, sharply angled on the upper edges, 4 mm. diam.

The type is in herb. *Thunberg* U.

Sand or gravel, mostly near the sea. on the central southern coast belt.

Var. *rigidum.*

MOSSEL BAY. Gouritz Riv. *Ecklon & Zeyher* 99.12 S.TCD: *Zeyher* TCD.

HUMANSDORP. Jeffreys Bay *Fourcade* 3282 BOL.

UITENHAGE. Uitenhage *Ecklon* BOL: *Zeyher* 412 BM.K.TCD: Swartkops *Lynes* BM: Addo Bush *Hafstrom & Lindberg* S: Aloes *J. L. Drege* 8048 BOL.

PORT ELIZABETH. P. E. *Baur* 997 K: *Lardley* Z: *Muir* 4040 K: *Hafstrom & Lindberg* S: Redhouse *Hafstrom* S: *Mogg* 4723 PRE: *Paterson* 1061 BOL.Z: Cape Recife *Compton* 13150 KIR: *Holland* 3705 BOL: *Zeyher* 634 SAM: Humewood *Pillans* BOL.

ALEXANDRIA. Paterson *Johnson* 1007 PRE.

ALBANY. Despatch *Holland* 419 BOL.SAM: Port Alfred *Britten* 1899 PRE.

Without locality:—*Thunberg* S: *Verreaux* TCD: *Zeyher* 237 G.

An unnumbered specimen collected by *Ecklon*, S, has been labelled "Caledon district".

Var. *villosum* Adamson var. nov.

A typo differt foliis caulibus juvenilibusque pilis longis patentibus et subappressis dense obtectis, foliis saepe congestis.

Not silvery. Young stems and leaves densely covered with rather long spreading and very loosely appressed hairs. Leaves generally crowded. Perianth with appressed hairs.

The type is *Zeyher* 2634 S.

In similar situations and often associated with var. *rigidum.*

PORT ELIZABETH. P. E. *Fries* 3199 S: Amsterdamvlakte *Zeyher* 2634 S.

ALEXANDRIA. Kolsand *Johnson* 1046 PRE.

ALBANY. Port Alfred *Burchell* 3782 K: *Rogers* 28053 K.SAM: *Salisbury* 181 PRE.

EAST LONDON. East London *Mason* K.

SOMERSET EAST. Somerset East *Acocks* 15739 PRE.

Without locality:—*Drege* (*A. rigidum*) S.

Var. *angustifolium* Sond. Fl. Cap. 2: 470. 1862.

A. argenteum Ecklon & Zeyher Enum. 325. 1837.

More slender and without ascending branches. Stems herbaceous. Young parts and leaves silvery with long appressed hairs and very few spreading ones. Flowers larger, opening quite flat. Perianth segments 5—8 mm. long, spreading, usually acuminate. Fruit smoothly rounded at the upper edges.

The type is *Ecklon & Zeyher* 2129 B (lost) cotype S.

Sand mostly by the coast.

CALEDON. Danger Point *Compton* 10220 KIR.

BREDASDORP. Bontebok Park *Compton* 22167 KIR: Struys Bay *Esterhuysen* 4425 BOL.

SWELLENDAM. Port Beaufort *Adamson* 3814, 4614: *Walgate* 821 KIR: Dipka *Zeyher* SAM.

RIVERSDALE. Elands Kop *Muir* 1780 PRE.

MOSSEL BAY. Gouritz Riv. *Ecklon & Zeyher* 2127 BOL.OXF.S: Kruidfontein *Pole Evans* 26 PRE.

UITENHAGE. Uitenhage *Ecklon* S: Coega *Compton* 19653 BOL: *Zeyher* 2643b S.

PORT ELIZABETH. P. E. *Fries, Norlindh & Weimarck* 37 BOL: *Hafstrom* S: *Martin* 141 KIR: *West* 98 K: Cape Recife *Ecklon* OXF.S: *Ecklon & Zeyher* 2122 S, 2129 BOL.S.

ALEXANDRIA. Bokness Strand *Johnson* 935 PRE.

ALBANY. Port Alfred *Fletcher* 6 PRE: *Schonland* 1536 Z.

EAST LONDON. Kaysers Beach *Galpin* 9730 K: *Nanni* 141 PRE.

Without locality:—*Drege* (*A. rigidum* (*b*)) G.S., *do.* (*A. sericeum*) S: *Masson* BM.

A. glinoides × *rigidum.*

Plants intermediate between the supposed parents and found growing in association with them are referred to this hybrid. Of the varieties of *A. rigidum* taking part, var. *angustifolium* appears to be the most frequent.

GRAAF-REINET. Graaf-Reinet *Codd* 2526 PRE.

PORT ELIZABETH. P. E. *Salter* 372/1 BM: *Wilms* 2432 BM.

ALEXANDRIA. Bushmans Riv. *Archibald* 5302 PRE.

ALBANY. Port Alfred *Bolus* BOL: Kowie West *Tyson* BOL.

EAST LONDON. Gonubie Mouth *Acocks* 9136 K.PRE: East London *Galpin* 1839 BOL.PRE.

4. A. Zeyheri Sond. Fl. Cap. 2: 470. 1862.

White, prostrate, with ascending branches. Covered all over with rather coarse closely appressed hairs, those on the stem pointing downwards. Stems woody. Leaves opposite, rather thick, sessile, 4—6 mm. long, 2—3 mm. wide, flat or more often concave above, on the young shoots separated by internodes 2—5 mm. long. Flowers small. Perianth segments about 2 mm. long, rounded, more or less obtuse, covered outside with appressed hairs. Fruit papulose, as deep as wide.

The type is *Zeyher* 717 S.

Among rocks on the Karoo. Rare and seldom collected.

A very distinctive species with small opposite sessile leaves, and small flowers.

NAMAQUALAND. Bitterfontein *Zeyher* 717 BOL.CGE.G.K.S.SAM. TCD.

WILLOWMORE. Willowmore *Acocks* 18404 PRE.

5. **A. Burchellii** N.E.Br. Kew Bull. 1908. 290.

In low tufts or bunches. Stems woody, up to 4 cm. diam., fluted, sometimes twisted or flattened, with many branches at or shortly above ground level. Branches ascending or horizontal, up to 8 cm. long. The younger parts and leaves densely covered with rather coarse appressed or occasionally spreading hairs. Leaves crowded at the branch tips, erect, secund, 1—2 cm. long, 0·3—0·4 cm. wide, narrowly elliptical or lanceolate, flat or more commonly folded upwards, the tips acute. Hairs on the leaves ascending but sometimes reflexed on the upper side and near the base. Flowers yellow, sessile, solitary but often crowded and contiguous on the branches. Perianth segments 4—6 mm. long, densely hairy outside. Stamens about 12. Stigmas 5. Fruit enclosed by the perianth, obconical but narrowed to the top, the valves free but bent inwards. Old fruits persistent.

The type is *Burchell* 1753 K.

Dry karroo areas in the N.W. Cape and in S.W. Africa.

The hairs are white, yellowish, tawny or rusty brown. Much eaten down by sheep and goats and often much deformed and appearing as a tuft with very short branches. Readily distinguished by the habit, the dense covering of appressed hairs and the crowded flowers.

S.W.A. Windhoek *Dinter* 848 K: Scharfenstein *Pearson* 8592 BM.BOL.K.SAM: Awas Mts. *Pearson* 9687 BOL.K: Friedental *Dinter* 7997 BM.BOL.G.K.PRE.S: Gt. Karasberg *Pearson* 8253 K.BOL: Keetmanshoop *de Winter* 3293 PRE: Gt. Rozynbosch *Pearson* 3831 SAM.BOL: Aggenys *Pearson* 2941 BOL: Awab Riv. *Loeb* X10 K.PRE.

GORDONIA. Upington *Theron* 763 K.PRE: Kakamas *Esterhuysen* 23572 BOL.

NAMAQUALAND. Wortel *Pearson* 3616 K: Aggenys *Pearson* 2941 BOL.K.

PRIESKA. Prieska *Bryant* 290 K. J.290 BOL.K.PRE, 3290 BOL: *Moss* 11246 BM: *Story* 1121 PRE.

HERBERT. Vaal Riv. *Burchell* 1753 K.

HAY. Blaauwbosch *Wilman* BOL: Bermolli *Wilman* BOL: Walhaarkoz *Esterhuysen* 2864 BOL: Lanyon Vale *Acock* 1969 K.

BARKLY WEST. Barkly West *Esterhuysen* 2415 BOL.

6. **A. asbestinum** Schltr. J. Bot. 35: 280. 1897.

A small tufted plant thinly covered all over by short stout appressed hairs. Stems woody, 2—8 cm. high, with several short branches at the top. Leaves erect, involute rolled and apparently subulate, 1·5—2·5 cm. long, almost pungent at the tip. Hairs on the leaves reversed. Flowers sessile. Perianth 1—1·3 cm. long, covered outside with ascending coarse short hairs: segments united for about half their length, the lobes acute. Perianth with many parallel veins inside, often prominent in the older stages. Fruit 3—4 mm. diam., 5—6 mm. deep, enclosed by the lower part of the perianth.

The type is *Marloth* 2075 B (lost), cotype PRE.

Confined to dry rocky or stony slopes on the Asbestos Mts.

Allied to *A. Burchellii* but smaller, with very narrow leaves, and a thin covering of short stout hairs.

HAY. Asbestos Mts. *Marloth* 2075 PRE: Niekerks Hope *Acocks* 314 PRE: Bermolli *Wilman* BOL: Wolhaarkop *Esterhuysen* 2864 BOL.

BARKLY WEST. Lokatula *Esterhuysen* 2415 BOL.

7. **A. karooicum** Compton Trans. Roy. Soc. S. Afr. 19: 283. 1931.

Woody, in small bunches with erect or procumbent branches 5—20 cm. long. Thinly covered all over with coarse short white closely appressed hairs, the hairs mostly pointing downwards. Leaves alternate, crowded at the base but scattered above, elliptical-lanceolate, flat but most often folded or rolled upwards, 1·5—3 cm. long, 0·3—0·5 cm. wide. Flowers solitary on the branches, sessile. Perianth segments 4—5 mm. long, acute or acuminate, covered outside with reversed hairs. Stamens about 20, in groups. Stigmas 5, short, erect. Fruit flattened, surrounded by the perianth.

The type is *Compton* 2966 BOL.

Sandy depressions on the southern part of the karoo.

Much eaten down by sheep and goats and often reduced to small tufts without branches. Stems and leaves purplish under the hairs. Hairs never continuous and sometimes widely scattered. In undamaged plants the inflorescence is monochasial. Similar to *A. Burchellii* in general habit but smaller and always with scattered hairs. The flowers are larger and less crowded.

ROBERTSON. Robertson Karoo *Levyns* 4348 CT: *Schmidt* 28 PRE: MacGregor *v. Niekerk* 377 BOL.

HEIDELBURG. Lemoenshoek *Adamson* 4595: Muiskraal *Adamson* 4601.

LAINGSBURG. Whitehill *Compton* 2966 BOL, 10859 KIR.

CALITZDORP. Calitzdorp *Compton* 8668 KIR.

"Karoo between Uitenhage & Albany" *Bowie* BM.

8. **A. Schellenbergii** Adamson nom. nov.

A. fruticosum Schellenb. Bot. Jahr. 48: 502. 1913 *non* L.f.

A grey or white rigid woody erect or sprawling shrublet. Stems 15—40 cm. high with ascending branches. Young part and leaves covered with rather short coarse white appressed hairs. Older stems glabrescent, pale-coloured and often pruinose. Leaves small, alternate, mostly on short shoots. Leaves oblong or obovate, 0·5—1·5 cm. long, 0·3—0·6 cm. wide, flat but usually folded upwards, acute at the tip, at the base narrowed to a short petiole. Flowers small, solitary but apparently grouped on the short shoots. Perianth 3—6 mm. long, covered outside with scattered appressed hairs, the segments acuminate, united at the base only. Stamens numerous. Stigmas 5. Fruit obovoid, much longer than wide, rounded or slightly lobed at the top.

The type is *Dinter* 887 Z.

Dry stony slopes and river beds in S.W. Africa and the N.W. Cape.

Very distinctive in habit. Much eaten by sheep and goats and often much modified in form. The hairs on the leaves are often reversed on the lower surface.

S.W.A. Tsumale *Dinter* 887 Z: Auasberg *Dinter* 3487 BM.BOL.K. PRE: Karibib *Dinter* 6896 BM.BOL.G.K.S.Z: Ganus *Pearson* 4484 K: Sabiesis *Pearson* 4108 K: Sandverhaar *Pearson* 4633 BOL.K.SAM: Kl. Karas *Dinter* 5102 BOL.K.PRE: Keetmanshoop *Liebenberg* 5170 K.PRE: *Pearson* 4348 BOL.K: *de Winter* 3264 K.PRE: Warmbad *Pearson* 4298 BOL.K: s.l. *Frick* 346a Z.

GORDONIA. Upington *Pole Evans* 2196 BOL.PRE.

KENHARDT. Kenhardt *Esterhuysen* 4002 BOL: Jagbult *Acocks* 12613 K.PRE: Marydale *Codd* 1214 PRE: *Story* 1094 PRE.

HERBERT. Katloni *Brueckner* 668 K.

HAY. Lanyon Vale *Acocks* 1954 BOL.PRE: Winstead *Acocks* 2041 PRE.

CARNARVON. Van Wyks Vlei *Acocks* 1745 PRE.

9. **A. virgatum** Welw. ex Oliv. Fl. Trop. Afr. 2: 584. 1871.

A rather slender erect shrublet with virgate almost herbaceous branches 40—90 cm. high. Shoots dying down to the base. woody at the base only. Young leaves and stems densely covered with spreading or partially appressed hairs and a few scales. Leaves alternate. 2-ranked. obovate or oblong, 3·5—5 cm. long, 1—1·7 cm. wide, obtuse or shortly apiculate, at the base gradually narrowed to a petiole. Young leaves white. the older glabrescent. the hairs appressed but spreading on the petiole. Flowers in groups on very short axillary branches. all along the shoot. Perianth segments 3—6 mm. long. united for a third their length. densely covered with appressed and spreading hairs. Filaments flattened near the base. Stigmas 5 or 4. Fruit obovoid. enclosed by the perianth. Seeds 1 or 2 in each chamber.

The type is *Welwitsch* 1113 K.

Dry rocky slopes and streambeds in the northern part of S.W. Africa and in Angola.

Very distinctive in habit and in leaf. Variable in size and in the density of the hairs in relation to habitat. In dry situations the leaves may be not more than 1·3 cm. long and 0·5 cm. wide.

S.W.A. Etosha Pan *de Winter* 2975 PRE: Otavi *Dinter* 5590 BOL. G.PRE.Z: Grootfontein *Kinges* 2864 PRE: Okahandja *Liebenberg* 5050 PRE: Okaputo *Engler* 6198 K: Lichtenstein *Dinter* 4456 S: Oliwarongo *Bradfield* 337 PRE: Karibib *Dinter* 6992 K: Auas Mts. *Boss* K: *Dinter* 3470 BOL.K.PRE: Nankloof Mts. *Rodin* 2148 BOL: *Strey* 2853 BOL.

10. **A. paniculatum** L. Sp. Pl. 488. 1753.

A. tomentosum Lam. Encyc. Meth. 3: 416. 1792.

A. stellatum Lam. l.c.

A. rarum N.E.Br. Kew Bull. 1908. 291.

A. lanceolatum Murr. Syst. Veg. ed. 8. 392. 1782.

A prostrate sprawling or semierect herbaceous perennial. the flowering shoots dying down to the base. Covered all over with white rather loosely appressed hairs. sometimes dense, sometimes lax. Stems several from the base, up to 50 cm. long, branched. Leaves opposite except in the inflorescence, crowded at the base, smaller and scattered above. Leaves oblanceolate to oblong, flat or concave above, 1·5—6 cm. long, 0·2—0·6 cm. wide, papulose, usually acute, narrowed at the base and the basal petiolate. Leaves densely hairy when young. glabrescent later especially on the upper side. Inflorescence 2—5 or more times forked, the flowers few or many. crowded or distant, with internodes between 0·5—3·5 cm. long. Flowers sessile in the forks, the bracts like leaves but smaller. Perianth 4—8 mm. long, the segments acute. red or pink, less often yellowish or cream-coloured inside, outside with few or many spreading hairs. Stamens in bunches of 3—10: anthers dark-coloured. Fruit 4—5 mm. long, 2—3 mm. diam., enclosed by the erect perianth·

The type is in herb. *Linn.* (650: 6).

Sand at low altitudes along the western coastal belt.

Though ordinarily perennating from the base, plants often flower in the first year and in unstable habitats may behave as annuals. Variable in size, the width of the leaves, the quantity of hairs, and especially in the inflorescence. The last is often secund and flat on the ground. It may have short branches and rather crowded small flowers, 4—5 mm. across, or longer branches and few distant larger flowers, 5—8 mm. across. There are all stages of intermediate. The forms with distant larger flowers are found especially when growing among bushes. *A. rarum* N.E.Br. (type *Burchell* 1013 K) is not more than a rather extreme state of this latter form.

VAN RHYNSDORP. Giftberg *E. P. Phillips* 7501 BOL.K.SAM: Knechtsvlakte *Leipoldt* 4015 BOL: Nardouw Kloof *Stokoe* SAM.

CLANWILLIAM. Heerenlogement *Pearson* 6754 K: Zeekoe Vlei *Schlechter* 8491 BM.BOL.G.K.S.Z: Clanwilliam *Bolus* BOL: Elands Kloof *Stokoe* SAM: Duivels Kloof *Stokoe* SAM: Olifants Riv. *Schlechter* 5016 BOL.Z: *Stephens* 7174, 7301 K: Citrusdal *Herre* BOL: Modderfontein *Compton* 4287 BOL.

PIKETBERG. Piketberg *Bolus* 7544 BOL: *Edwards* 169 Z: *Esterhuysen* 23119 BOL: *Guthrie* 2612 KIR: de Hoek *Compton* 10912 KIR: Redlinghuis *Lewis* 3198 SAM.

MALMESBURY. Saldanha Bay *Ecklon* 212 S: *Ecklon & Zeyher* 2141 BOL.S: *Marloth* 7115 PRE: Hopefield *Bachmann* 852, 853 Z: *Bolus* BOL: *Letty* 3 PRE: Darling *A. L. Grant* 2547 BM: *Lewis* 1802 SAM: *Stokoe* SAM: Mamre *Adamson* 4948: *Bolus* 4278 BOL: *L. Bolus* BOL: *Compton* 13746, 17439 KIR: Ganskraal *Compton* 9448 KIR: Schaaplaats *Bachmann* 1990 Z.

TULBAGH. Nieuwekloof *Burchell* 1013 K.

STELLENBOSCH. Stellenbosch Flats *Duthie* 658 BOL: Brakenfel *Acocks* 2085, 5309 S: Bottelary *Acocks* 3344 S.

CAPE. Cape Flats *Ecklon & Zeyher* 2141 BOL.OXF.SAM: *Harvey* TCD: Milnerton *Compton* 16320 KIR: *Hutchinson* 553 BOL.K: Riet Valley *Ecklon & Zeyher* 62.11 S: Cape Town *Pappe* S: Camps Bay *Hafstrom* S: Camp Ground *Page* CT: Wynberg *Harvey* TCD: Chapmans Bay *Adamson* 2023 BOL: *Wolley-Dod* 1669 BM.BOL.K: Kommetje *Barker* 848 KIR: *L. Bolus* BOL.K: Muizenburg *Bolus* 7008 BOL: *Guthrie* 936 CT: *Marloth* 8985 PRE: Kalk Bay *Prior* K.Z: Simonstown *Ecklon & Zeyher* S: Schoesters Riv. *Salter* 270/13 BM: Witsands *Marais* CT.

Without locality:—*Auge* BM: *Burmann* G: *Drege* 7057 G.K, 7058a

G, s.n. S: *Gueinzius* S: *Lalande* BOL: *Montini* S: *Niven* BM: *Pappe* K.S: *Roxburgh* G: *Thunberg* S: *Wright* 466 TCD: *Zeyher* 393 K: "Hort. Kew" BM.

A specimen. *Bowie* BM, has been labelled in pencil "Sundays River. Uitenhage". This is almost certainly a mistake in the real locality.

11. **A. sarmentosum** L.f. Supp. Pl. 261. 1781.

Mesembryanthemum hexaphyllum Haw. Rev. Pl. Succ. 108. 1827.

A lax procumbent many-stemmed perennial with few or many branches. Stems 10—50 cm. long, woody at the base only, the younger reddish brown, with few or many appressed or spreading white hairs or scales. Leaves opposite, separated by internodes 0·5—5 cm. long. Leaves 1—4·5 cm. long, almost cylindrical, connate at the base, with few or many hairs or sometimes glabrous except for the leaf-sheath. Flowers sessile, terminal on the branches, each with a pair of leaves below, most commonly in groups of three, the lateral on branches 0·5—2 cm. long. Perianth segments 6—8 mm. long, white or cream-coloured inside, outside with white appressed hairs, the lobes acute, shortly cucullate, mucronate. Stamens in bunches of 3—8, the filaments of the bunches often united at the base. Fruit finally almost woody, turbinate, flat-topped, 0·4—0·7 cm. diam. at the top, persistent on the older stems.

The type is in herb. *Linn.* (650: 3).

Stones, gravel or rocks, usually under bushes, on the lower slopes in the S.W. Cape.

Variable in habit. Most commonly procumbent but in drier situations semierect. Internodes long or short. Glabrous or hairy with all gradations from a few scattered hairs on the young internodes and leaf bases to a dense covering all over. The more hairy forms are found especially towards the northern limits of the range and are usually much branched and more or less erect. Ecklon & Zeyher, Enum. 327. 1837, described two varieties, *strigosum* and *hirsutum*, but these do not seem more than stages in a continuous series and are not at all clearly separable. The fruit are persistent and remain attached and apparently lateral on the old stems.

NAMAQUALAND. Port Nolloth *Bolus* 9530 BOL.

PIKETBERG. Piketberg *Bolus* BOL: *Guthrie* KIR: *Schlechter* 5253 5255 Z.

TULBAGH. Tulbagh *Rehmann* 2235 Z: Waterfall *Ecklon & Zeyher* 2140 BOL.G.K: *Guthrie* 2943 KIR: *Zeyher* SAM.TCD: Tulbagh Kloof *Zeyher* S.SAM.

PAARL. Huguenot *Salter* 4667 BM.K: Agter Paarl *Barker* 339 KIR.

STELLENBOSCH. Jonkershoek *Strey* 787 PRE: Bottelary *Acock*

609 S: Firgrove *Compton* 13454 BOL.KIR: Van der Stel *C. A. Smith* 3202 PRE: Gordons Bay *Adamson* 4942: *Parker* 4116 BOL.K.KIR.

MALMESBURY. Hopefield *Bachmann* 1992 Z: Darling *Drege* S: Mamre *L. Bolus* BOL: *Zeyher* 720 BM.BOL.K.SAM: Malmesbury *Compton* 7803 KIR.

CAPE. Vissers Hoek *Compton* 13430 KIR: Melkbosch *Adamson* 4681: *Compton* 18102 KIR: Cape Flats *Bolus* 3000 BOL: *Ecklon* 2141 OXF p.pte: *Rehmann* 2143 Z: Bellville *Compton* 20753 KIR: Milnerton *Hafstrom* S: Durbanville *Adamson* 4691: Cape Town *Ecklon* S: *R. & T. Fries* 3423 S: *Harvey* TCD: *Page* BOL: *Prior* Z: *Rehmann* 1521 Z: *Worsdell* K: Sea Point *C. A. Smith* 2881 PRE: *Wilms* 3250 K: Camps Bay *Cassidy* 5 KIR: *Letty* 161 PRE: *Marloth* 1555 PRE: *Prior* K: *Salter* 270/14 BM: Bakoven *Hafstrom* S: Hout Bay *Bond* 135 KIR: Signal Hill *Adamson* 2326 BOL, 2632 CT: *Michell* CT: Lion's Head *Ecklon & Zeyher* 2140 S.TCD: *Harvey* TCD: *Kensit* CT: *Hafstrom* S: Kloof Nek *Bullock* 4026 K: *Ecklon & Zeyher* 2140 BOL.S.TCD: Table Mt. *Ecklon* 11b G.K.S: *MacOwan* 730 BM.BOL.K.PRE.SAM: s.n. G: 2494 SAM: *Stokoe* SAM: *Worsdell* K: Blinkwater *Rehmann* 1358 BM.Z: Devils Peak *Bolus* 2437 BOL: *Gerstner* 6426 PRE: *Pappe* K.S: *Tyson* 2437 BOL: *Zeyher* 720 K: Observatory *Davies* SAM: Raapenburg *Guthrie* 1168 CT: Camp Ground *Adamson* 1924: *Barker* 1041 KIR: *Cross* 43 KIR: *Isaac* BM.BOL: *Salter* 9619 BOL: Groote Schuur *Wolley-Dod* 255 BM.K: Kenilworth *Wolley-Dod* 1301 BOL: Wynberg *Drege* S: Fishhoek *Adamson* 2893: Glencairn *Compton* 4582 BOL.KIR, 11586 BOL: *Page* CT: Simonstown *Godman* 72 BM: *Harvey* TCD: *Jameson* K: Smiths Farm *Compton* 6069 KIR.

CALEDON. Pringle Bay *Gillett* 4201 PRE: Caledon *Bond* 128 KIR: *Gillett* 4255 PRE: Swartberg *Ecklon & Zeyher* 2140b TCD: Klein Riv. *Zeyher* 721 BOL.

MONTAGU. Montagu *Barnard* CT.SAM.

SWELLENDAM. Port Beaufort *Drege* S.

Without locality:—*Burchell* K: *Burmann* G: *Drege* 7056a TCD.CGE: *Harvey* TCD: *Grey* K: *Masson* 15 BM: *Miers* 357 BM: *Montini* S: *Roxburgh* BM: *Ryder* BM.K: *Sparmann* S: *Rogers* 11379 Z: *Thunberg* S: *Verreaux* G.TCD.

A. paniculatum × *sarmentosum.*

The plants referred to this presumed hybrid form a complete series between the parent species. They are found in stations where both occur. Some are like *A. paniculatum* but with very narrow leaves, others are nearer *A. sarmentosum* but with a many-flowered inflorescence. It is most probable that some of the hairy forms attributed to *A. sarmentosum* are really to be placed under this hybrid.

The following are referred here:

PIKETBERG. Kapiteins Kloof *Lewis* 3197 SAM.

MALMESBURY. Mamre *Bolus* 4279 BM: *L. Bolus* BOL: Kalabas Kraal *Hutchinson* 188 BOL.K: Moorreesburg *Esterhuysen* 23099 BOL.

PAARL. Huguenot *Salter* 4667 BOL: Wellington *Grant* 2357 K.

STELLENBOSCH. Jonkershoek *Garside* 296 K.

CAPE. Phesantekraal *v. Niekerk* 157 BOL.

Without locality:—*Drege* 7056a BOL.K.

Sub-gen. 2. *Aizoanthemum* Adamson *comb. nov.*

Dinter ex Friedr. Mitt. Bot. Munch. 17—18: 344. 1957. *pro. gen.*

Annuals without hairs but papulose all over, the papillae sometimes drawn out as flat scales. Flowers solitary, usually sessile, in the forkings of the stem. Perianth forming a cup round the ovary. Stamens often in more than one row, the filaments flat, ribbon-like, more or less dilated at the base. Ovary spherical, papulose, 5, 7 or 10-chambered. Fruit opening by as many valves as there are chambers, the valves finally spreading and more or less hygroscopic.

The type species is *A. membrum-connectens* (Dinter ex Friedr.) Adamson.

The subgenus comprises about 8 species. Those in the southern area of distribution are confined to southern Angola and the northern parts of S.W. Africa. In the northern area *A. hispanicum* L. has a wide range. It extends into Spain and Sicily on the north side of the Mediterranean. The other species are local endemics.

Aizoanthemum was first put forward as a separate genus by Dinter, Kaktnk. 1935. 2: 27, but was not given a valid description. As several of the features that are made use of for its separation are found in species belonging to subgenus *Aizoon*, it is here treated as a subgenus. The only really distinguishing characters are the absence of hairs and the spreading partly hygroscopic valves in the fruit. The very numerous stamens with flattened filaments of which the outermost in some species are without anthers, and the unequal perianth segments, suggest a possible transition to such a genus as *Cryophytum* N.E.Br.

KEY TO THE SPECIES.

1. Leaves opposite: coarsely papulose without scales: perianth 2—3 mm. long: filaments smooth: stigmas 5 .. .. 13. *galenioides*

1. Leaves alternate: papulose with scales: perianth over 5 mm. long: filaments denticulate.
    2. Slender: finely papulose: leaves petiolate: perianth 7—10 mm. long: stigmas 5 .. .. 12. *mossamedense*
    2. Stout: coarsely papulose: upper leaves without petioles: stigmas 7—10.

3. Erect: papulose with few scales: flowers many: perianth 5—7 mm. long: stigmas 7	14. *Dinteri*
3. Prostrate or sprawling: papulose with many scales: flowers solitary: perianth 7—10 mm. long: stigmas 7—10	15. *membrum-connectens*

12. **A. mossamedense** Welw. ex Oliv. Fl. Trop. Afr. 2: 584. 1871.

A rather slender brownish green annual up to 25 cm. high with spreading forked branches. Rather thinly papulose all over and with small scales on the young parts and flowers. Leaves alternate, oblong obovate or narrowly spatulate, 2—3 cm. long, 0·3—1·3 cm. wide, obtuse or subobtuse, with petioles as long as the blades. Flowers solitary in the forks of the stem, usually rather distant, bright yellow, 1—1·5 cm. across. Perianth erect, the lobes acute, the inner with membranous edges. Perianth segments united at the base only. Stamens in 2—3 rows, the filaments dark-coloured, flattened, minutely denticulate at the edges: anthers oblong, bright yellow. Stigmas 5. Fruit almost spherical, 1 cm. diam., papulose. Seeds black, reniform, with acute concentric ridges.

The type is *Welwitsch* 1264 BM.

Coastal sands in southern Angola. Not recorded elsewhere.

A distinctive species separated from others by the petiolate leaves, large flowers, and 5 carpels. It is most nearly related to *A. hispanicum* L. but is more slender, with petiolate leaves, and quite sessile flowers. Much less coarsely papulose than the other species in the subgenus.

ANGOLA. Mossamedes *Pearson* 2153 K: *Welwitsch* 1264 BM, 2380 G.K.

13. **A. galenioides** Fenzl ex Sond. Fl. Cap. 2: 469. 1862.

Aizoanthemum galenioides Friedr. Mitt. Bot. Munch. 17—18: 344. 1957.

An erect glistening coarsely papulose annual about 15 cm. high, with ascending branches. Papillae large, vesicular, not drawn out into scales. Leaves opposite, oblong or elongate-oblong, 1·5—2·5 cm. long, 0·3—0·4 cm. wide, flat or curled upwards, at the top rounded or subacute, at the base narrowed to a short petiole. Flowers small, solitary, sessile in the forks of the stem. Perianth 2—3 mm. long, the lobes erect, cucullate, densely papulose, united for about a quarter their length. Stamens with flat but smooth-edged filaments. Ovary papulose: stigmas 5.

The type is *Drege* 7060 W (lost), neotype *Dinter* 7884 M.

Rare on sand near the coast in northern S.W. Africa.

Distinguished by the coarse papillae without scales, the opposite leaves and small inconspicuous flowers. The specimens collected by Drege, which may form part of the original gathering, are less branched and have larger leaves than those of Dinter. The two are certainly conspecific. In collections there has been some confusion due to referring to this species specimens of *Galenia Dregeana* Fenzl.

S.W.A. Swakopmund *Dinter* 7884 BM.K.S.

Without locality:—*Drege* (*A. galenioides*) S.

14. **A. Dinteri** Schinz Bull. Herb. Boiss. 6: 523. 1898.

Aizoanthemum Dinteri Friedr. Mitt. Bot. Munch. 17—18: 344. 1957.

Erect with many forking stems, 20—25 cm. high, rather coarsely papulose all over, the young parts with some scales. Older stems woody. Leaves alternate, broad-ovate oblong or rhombic, 1—5 cm. long, 0·4—2 cm. wide, rather thick, flat or curled or folded upwards, narrowed at the base to a petiole, short in the upper as long as the blade in the lower leaves. Lower leaves larger than the upper, all deciduous at or about the fruiting stage. Flowers sessile or on peduncles up to 4 mm. long, in the forks. Perianth 5—6 mm. long, papulose scaly, the segments united for about a third their length, the lobes unequal, the outer acute, the inner mucronate with a wide membranous margin. Stamens in 2—3 rows, the filaments flat, sharply denticulate at the edges, the outermost sometimes wider and without anthers. Ovary spherical, papulose: stigmas 7. Fruit 3—5 mm. diam. Seeds black, marked by acute concentric rings.

The type is *Dinter* 55 Z.

Sand at low altitudes in the northern parts of S.W. Africa.

A variable species in size, the amount of branching, and the size of the leaves. In collections Dinter has attached a number of names to specimens, e.g. *A. Bossii*, *A. sphingis*, *A. stellatum*, but pending more detailed field work all are treated as belonging to one species. In some specimens 1—3 of the perianth lobes are much elongated, 5—9 mm. The stamens may be all alike or the outermost may be without anthers and with filaments about twice as wide as the inner.

S.W.A. Etosha Pan *Brain* P. 10 PRE: *Dinter* s.n. Z: Swakopmund *Dinter* 55 Z: Ebony Stn. *Dinter* 7877 BM.K.S: Erongo Mts. *Dinter* 7077 BM.K.S: Spunzflachte *Dinter* 8455. 8456 K: Brandberg *Liebenberg* 4983 PRE: *Wiss* 1446 PRE.

15. **A. membrum-connectens** (Dinter ex Friedr.) Adamson comb. nov.

Aizoanthemum membrum-connectens (Dinter Kaktnk. 1935. 2: 27. *nomen*) Friedr. Mitt. Bot. Munch. 17—18: 345. 1957.

A stout prostrate or sprawling annual with horizontal diverging branches up to 30 cm. long. Covered all over with coarse vesicular papillae. the young parts and flowers also with scales. Leaves alternate, obovate oblong or rhombic, 1—3 cm. long, 0·5—1·2 cm. wide, flat, acute, narrowed at the base but scarcely petiolate. Flowers large, 0·8—1·2 cm. diam., sessile in the forks, often secund. Perianth cup-like, coarsely papulose-scaly, the segments united for about half their length, the lobes acute, erect but slightly spreading at anthesis. Stamens very numerous, in about 3 rows: filaments sharply denticulate. Ovary globose, papulose: stigmas 7—10. Fruit 6—8 mm. diam., flattened or depressed on top.

The type is *Strey* 2496 M.

Open places on sand generally near the coast in S.W. Africa.

A much larger and stouter plant than *A. Dinteri*, with much larger flowers. The stems may be as much as 1 cm. diam. at the base. The rather inadequate description of *Mesembrianthemum Rehmannii* Schinz Bull. Herb. Boiss. 5. App. 3: 80. 1897, seems to fit this species. But as neither the type nor any other specimen has been seen, it must remain uncertain. A specimen from Damaraland collected by Rehmann, in herb. Zurich, which is so named, is certainly not this species. It has long petaloid staminodes.

S.W.A. Swakopmund *Dinter* 7828 K: Rehoboth *Strey* 2148, 2496, 2604, 2643 PRE: Nankloof Mts. *Rodin* 2841 BOL: *Strey* 2138 BOL.

INDEX OF NUMBERED SPECIMENS QUOTED.

ACOCKS. 314 *asbestinum;* 609 *sarmentosum;* 1745, 1954 *Schellenbergii;* 1969 *Burchellii;* 2041 *Schellenbergii;* 2085, 3344, 5309 *paniculatum;* 9103 *glinoides;* 9136 *glinoides* × *rigidum;* 9914 *canariense;* 11925 *glinoides;* 12613 *Schellenbergii;* 12660 *canariense;* 12787 *glinoides;* 15739 *rigidum* v. *villosum;* 18404 *Zeyheri*

ADAMSON. 1924 *sarmentosum;* 2023 *paniculatum;* 2061 *canariense;* 2326, 2632, 2893 *sarmentosum;* 3814 *rigidum* v. *angustifolium;* 3818 *glinoides;* 4474, 4518, 4535 *canariense;* 4595, 4601 *karooicum;* 4612 *glinoides;* 4614 *rigidum* v. *angustifolium;* 4681, 4691 *sarmentosum;* 4764 *glinoides;* 4942 *sarmentosum;* 4948 *paniculatum;* 4988, 5010 *canariense,* 5204, 5270, 5285 *glinoides.*

ARCHIBALD. 5302 *glinoides* × *rigidum.*

BACHMANN. 852, 853, 1990 *paniculatum;* 1992 *sarmentosum.*

BARKER. 339 *sarmentosum;* 848 *paniculatum;* 1041 *sarmentosum;* 2101 *glinoides;* 2840 *glinoides.*

BARNARD. 437 *sarmentosum.*

BAUR. 897 *rigidum.*

BOLUS. 277, 435, 1910 *glinoides;* 2437, 3000 *sarmentosum;* 4278 *paniculatum;* 4279 *paniculatum* × *sarmentosum;* 7008, 7544 *paniculatum;* 9530 *sarmentosum;* 9531 *canariense;* 13281 *glinoides.*

BOND. 128, 135 *sarmentosum.*

BRADFIELD. 337 *virgatum.*

BRAIN. P10 *Dinteri.*

BRITTEN. 1899 *rigidum.*

BRUECKNER. 668 *Schellenbergii.*

BRYANT. 290, J290, 3290 *Burchellii.*

BURCHELL. 1013 *paniculatum;* 1753 *Burchellii;* 2865 *canariense;* 3782 *rigidum* v. *villosum;* 3103 *canariense.*

BULLOCK. 4026 *sarmentosum.*

CASSIDY. 5 *sarmentosum.*

CODD. 2522 *glinoides* × *rigidum;* 1214 *Schellenbergii.*

COMINS. 1594 *glinoides.*

COMPTON. 2966 *karooicum;* 4287 *paniculatum;* 4582 *sarmentosum;* 6069, 7803 *sarmentosum;* 8668 *karooicum;* 9448 *paniculatum;* 10220 *rigidum* v. *angustifolium;* 10859 *karooicum;* 10912 *paniculatum;* 11053, 11417 *canariense;* 11586 *sarmentosum;* 13150 *rigidum;* 13430, 13454 *sarmentosum;* 13746, 16320 *paniculatum;* 17223 *canariense;* 17439 *paniculatum;* 18102 *sarmentosum;* 19087, 19109 *glinoides;* 19653 *rigidum* v. *angustifolium;* 20753 *sarmentosum:* 22167 *rigidum* v. *angustifolium.*

COOPER. 174 *glinoides.*

CROSS. 43 *sarmentosum.*

DINTER. 55 *Dinteri;* 848 *Burchellii;* 887 *Schellenbergii;* 949 *canariense;* 3470 *virgatum;* 3487 *Schellenbergii;* 4456 *virgatum;* 4742 *canariense;* 5102 *Schellenbergii;* 5590 *Burchellii;* 6896 *Schellenbergii;* 6992 *virgatum;* 7077 *Dinteri;* 7828 *membrum-connectens;* 7877 *Dinteri;* 7884 *galenioides;* 7997 *Burchellii;* 8455, 8456 *Dinteri.*

DREGE. 1130 *paniculatum* × *sarmentosum;* 7056a *paniculatum* & *paniculatum* × *sarmentosum;* 7057, 7058a *paniculatum;* 7884 *galenioides.*

DREGE J. L. 8048 *rigidum.*

DUTHIE. 658 *paniculatum.*

DYER. 1130 *sarmentosum;* 1437, 1662, 1663, 2129 *glinoides.*

ECKLON. 11b *sarmentosum;* 189 *glinoides;* 212 *paniculatum;* 259 *glinoides;* 412 *rigidum;* 2130, 2131 *glinoides;* 2140, 2141 *sarmentosum.*

ECKLON & ZEYHER. 2.9 *canariense;* 11.12 *glinoides;* 62.11 *paniculatum;* 99.12 *rigidum;* 259 *glinoides;* 2122 *rigidum* v. *angustifolium;* 2127 *rigidum* v. *angustifolium;* 2128 *canariense;* 2129 *rigidum* v. *angustifolium;* 2130, 2131 *glinoides;* 2140, 2140b *sarmentosum;* 2141 *paniculatum* & *paniculatum* × *sarmentosum.*

EDWARDS. 169 *paniculatum.*

ENGLER. 6198 *virgatum.*

ESTERHUYSEN. 1413 *canariense;* 2415 *asbestinum;* 2864 *asbestinum;* 4002 *Schellenbergii;* 4425 *rigidum* v. *angustifolium;* 15145 *glinoides;* 23119 *paniculatum;* 23572 *Burchellii;* 23099 *paniculatum* × *sarmentosum.*

FLANAGAN. 120 *glinoides.*

FLECK. 346a *Schellenbergii.*

FLETCHER. 6 *rigidum* v. *angustifolium.*

FOURCADE. 2272 *glinoides;* 3282 *rigidum;* 3646 *glinoides.*

FRIES. 3199 *rigidum* v. *villosum;* 3423 *sarmentosum.*

FRICK. 346a *Schellenbergii.*

FRIES, NORLINDH & WEIMARCK. 37 *rigidum* v. *angustifolium.*

GALPIN. 1839 *glinoides* × *rigidum;* 9730 *rigidum* v. *angustifolium;* 10823, 13243 *glinoides.*

GARSIDE. 296 *paniculatum.*

GERSTNER. 2420 *canariense;* 6426 *sarmentosum.*

GILL. 43 *glinoides.*

GILLETT. 4201, 4225 *sarmentosum.*

GODMAN. 72 *sarmentosum.*

GRANT. 2356, 2547 *paniculatum;* 2357 *paniculatum* × *sarmentosum.*

GUTHRIE. 936 *paniculatum;* 1168 *sarmentosum;* 2612 *paniculatum;* 2943 *sarmentosum.*

HARVEY. 259 *glinoides.*

HENRICI. 5018 *glinoides.*

HERRE. S.U.G. 12930 *paniculatum.*

HOLLAND. 8 *canariense;* 419 *rigidum;* 3705 *rigidum.*

HUTCHINSON. 168 *sarmentosum;* 188 *paniculatum* × *sarmentosum;* 553 *paniculatum;* 1448 *glinoides.*

JACOTTET. 24 *canariense.*

JOHNSON. 72 *glinoides;* 307 *canariense;* 935 *rigidum* v. *angustifolium;* 1007 *rigidum;* 1046 *rigidum* v. *villosum.*

KING. 130 *canariense.*

KINGES. 2864 *virgatum.*

LEIPOLDT. 4015 *paniculatum.*

LETTY. 3 *paniculatum;* 101 *sarmentosum.*

LEVYNS. 4348 *karooicum.*

LEWIS. 1802 *paniculatum;* 3197 *paniculatum* × *sarmentosum;* 3198 *paniculatum.*

LIEBENBERG. 4983 *Dinteri;* 5050 *virgatum;* 5170 *Schellenbergii.*

LOEB. X10 *Burchellii.*

MAGUIRE. 323, 587 *canariense.*

MACOWAN. 730 *sarmentosum;* 277 *glinoides;* 445 *glinoides;* 2494 *sarmentosum.*

MARDON. 108 *canariense.*
MARLOTH. 1555 *sarmentosum;* 2075 *asbestinum;* 4104 *canariense;* 6852 *glinoides;* 7115, 8985 *paniculatum;* 10873 *glinoides.*
MARTIN. 141 *rigidum* v. *angustifolium;* 652 *glinoides.*
MASSON. 15 *sarmentosum.*
MEYER. 3 *canariense.*
MIERS. 357 *sarmentosum.*
MOGG. 1723 *rigidum;* 13215 *canariense.*
MOSS. 4373 *canariense;* 11246 *Burchellii;* 18127 *sarmentosum.*
MUIR. 4780 *rigidum* v. *angustifolium;* 4040 *rigidum.*
NANNI. 141 *rigidum* v. *angustifolium.*
v. NIEKERK. 157 *paniculatum* × *sarmentosum;* 377 *karooicum.*
NIVEN. 17 *glinoides.*
PARKER. 4116 *sarmentosum.*
PATERSON. 1061 *rigidum.* 644 *glinoides.*
PEARSON. 2153 *mossamedense;* 2941 *Burchellii;* 2831 *virgatum;* 3616, 3831 *Burchellii;* 4108, 4298, 4348, 4484, 4633 *Schellenbergii;* 5592 *Burchellii;* 6754 *paniculatum;* 8253, 8592, 9687 *Burchellii*
PEGLER. 2041 *canariense.*
PENTHER. 1806 *glinoides.*
PHILLIPS, E. P. 7501 *paniculatum.*
POLE EVANS. 26 *rigidum* v. *angustifolium;* 2196 *Schellenbergii;* 2542 *glinoides;* 3970 *canariense.*
REHMANN. 1350, 1521, 2143, 2235 *sarmentosum;* 3197 *canariense;* 5907 *canariense;* 7522, 8753-4 *canariense.*
RENNIE. 78 *glinoides.*
RODIN. 2148 *virgatum;* 2841 *membrum-connectens.*
ROGERS. 3563 *glinoides;* 11379 *sarmentosum;* 12030, 16629, 16649, 27341 *glinoides;* 28053 *rigidum* v. *villosum;* 35632 *glinoides.*
RUDATIS. 1933 *canariense.*
SALISBURY. 181 *rigidum* v. *villosum.*
SALTER. 270/13 *paniculatum;* 270/14 *sarmentosum;* 372/1 *glinoides* × *rigidum;* 4667 *sarmentosum* & *paniculatum* × *sarmentosum;* 9619 *sarmentosum.*
SCHLECHTER. 75 *canariense;* 2561 *glinoides;* 2819 *canariense;* 5016 *paniculatum;* 5331 *paniculatum;* 5253, 5255 *sarmentosum;* 6125 *glinoides;* 8491 *paniculatum;* 8593 *canariense.*
SCHMIDT. 28 *karooicum.*
SCHONLAND. 1536 *rigidum* v. *angustifolium.*
SCULLY. 47 *glinoides.*
SMITH, C. A. 2881, 3202 *sarmentosum.*
STEPHENS. 7174, 7301 *paniculatum.*
STORY. 1094 *Schellenbergii;* 1121 *Burchellii;* 1301 *glinoides.*
STREY. 787 *sarmentosum;* 2138, 2148, 2496, 2604, 2643 *membrum-connectens;* 2853 *virgatum.*
THERON. 420 *glinoides;* 763 *Burchellii;* 1812 *glinoides.*
THODE. 12662 *glinoides.*
TYSON. 2 *canariense;* 301, 976 *glinoides;* 2437 *sarmentosum.*
WALGATE. 821 *rigidum* v. *angustifolium.*
WARD. 380 *glinoides;* 2140 *canariense.*
WELWITSCH. 1113 *virgatum;* 1264, 2380 *mossamedense.*
WEST. 98 *rigidum* v. *angustifolium;* 1235 *canariense.*
WILMS. 2432 *glinoides* × *rigidum;* 3230 *sarmentosum.*
DE WINTER. 2975 *virgatum;* 3264 *Schellenbergii;* 3293 *Burchellii.*
WISS. 1446 *Dinteri.*
WOLLEY-DOD. 255, 1301 *sarmentosum;* 1669 *paniculatum.*
WOOD. 533, 681 *canariense.*
WRIGHT. 466 *paniculatum.*
ZEYHER. 99.12 *rigidum;* 237 *rigidum;* 259 *glinoides;* 393 *paniculatum;* 412 *rigidum;* 625 *paniculatum;* 634 *rigidum;* 717 *xeyheri;* 718 *canariense;* 720, 721 *sarmentosum;* 2632 *glinoides;* 2634 *rigidum* v. *villosum;* 2634b *rigidum* v. *angustifolium.*

INDEX.

- *Aizoanthemum* Dinter ex Friedr.
  - *A. Bossii.*
  - *A. Dinteri* Friedr.
  - *A. galenioides* Friedr.
  - *A. membrum-connectens* Dinter ex Friedr.
  - *A. sphingis.*
  - *A. stellatum.*
- Aizoon L.
  - *A. argenteum* E. & Z.
  - A. asbestinum Schltr.
  - A. Burchellii N.E.Br.
  - A. canariense L.
    - v. *denudatum* Sond.
  - A. Dinteri Schinz.
  - *A. fruticosum* Schellbg.
  - *A. fruticosum* L.f.
  - A. galenioides Fenzl.
  - A. glinoides L.f.
  - *A. hirsutum* E. & Z.
  - *A. hispanicum* L.
  - A. karooicum Compton.
  - *A. lanceolatum* Murr.
  - A. membrum-connectens Dinter ex Friedr.
  - A. mossamedense Welw.
  - A. paniculatum L.
  - *A. procumbens* Crantz.
  - *A. rarum* N.E.Br.
  - A. rigidum L.f.
    - v. angustifolium Sond.
    - v. rigidum.
    - v. villosum Adamson.
  - A. sarmentosum L.f.
    - v. *hirsutum* E. & Z.
    - v. *strigosum* E. & Z.
  - A. Schellenbergii Adamson.
  - *A. stellatum* Lam.
  - *A. tomentosum* Lam.
  - A. virgatum Welw.
  - A. Zeyheri Sond.
- *Cryophytum* N.E.Br.
- *Galenia Dregeana* Fenzl.
- *Glinus procumbens* Forsk.
- *Gunniopsis* Pax & Hoffm.
- *Mesembryanthemum hexaphyllum* Haw.
  - *M. Rehmannii* Schinz.
- *Veslingia* Moench.
  - v. *cauliflora* Moench.